CHAPTER 1 - INTRODUCTION

Radiation protection regulations and guidance are based on the conservative assumption that any amount of radiation, no matter how small, can have a harmful effect on an adult, child, or unborn child. The University of Rhode Island (URI) has established policies and procedures for the safe handling and use of radioactive materials and x-rays. The University has safely handled radioactive materials and x-ray equipment for many years.

Each authorized user has been reviewed and approved by the University's Radiation Safety Committee and specifically licensed to supervise the handling of radioisotopes. An authorized user is generally a faculty or staff person qualified by training and experience to supervise the use of radioactive materials. Authorized users must ensure proper storage and use of all radioactive materials used under their supervision. If you wish to become an authorized user, you should contact the Radiation Safety Officer.

Individuals successfully completing this course become certified radiation workers under our license. Certified radiation workers generally work under the supervision of an authorized user, are permitted to handle more than exempt quantities of radioactive materials and are considered occupationally exposed under state regulations.

This training manual discusses basic concepts, introduces basic radiation safety principles and provides general recommendations for the use of radioisotopes and x-ray equipment at URI. The manual includes general recommendations that may not apply to particular protocols. If you are uncertain, you should ask your authorized user or contact the Radiation Safety Office for advice regarding a specific technique.

Some of you may be familiar with radiation safety principles from training and/or experience at other colleges and universities. Radiation safety programs have changed significantly since the implementation of new regulations in 1994. We attempt to maintain our exposures, releases or contamination well below the regulatory limits. Practical measures to incorporate basic radiation safety and ALARA[1] measures into our work practices are included in this manual to assist radioisotope and x-ray users. These simple concepts and easy precautions have been successfully applied for a number of years at the University and will minimize your exposure.

This manual begins with a brief review of basic scientific concepts relating to radioactivity. It briefly reviews the extensive body of scientific information relating to the biological effects of ionizing radiation. Next, it examines the radiation protection regulations and general principles of radiation protection. The manual

[1] ALARA is an acronym meaning As Low As Reasonably Achievable.

then examines the basis for determining a laboratory's suitability for handling radioisotopes.

After a discussion of personnel monitoring and bioassay, the manual examines safe working practices with an emphasis on contamination control. The next sections deal with x-rays and radiation detection instruments. Finally, the manual provides two US Nuclear Regulatory Commission Regulatory Guides dealing with the risks of radiation and a discussion of the regulatory requirements for pregnant radiation workers. The manual supplements discussions in class, provides a basic training reference and should be read before attending the radiation worker training class.